

Sports Medicine Monthly

Editor: Darren H. Lunow, M.Ed, ATC, LAT • Certified Athletic Trainer

Volume 3, Issue 3, October 2011

MANAGEMENT OF CONCUSSION:

Defining a Concussion

In 2008, the Third International Conference on Concussion in Sport was held in Zurich, Switzerland. These conferences have included neurosurgeons, neurologists, as well as team physicians, and representatives from the International Olympic Committee (IOC), the Federation Internationale de Football Association (FIFA), and the International Ice Hockey Federation (IIHF). From this most recent conference:



‘A concussion is defined as a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces. Several common features that incorporate clinical, pathologic, and biomechanical injury constructs that may be utilized in defining the nature of a concussion head injury may include

1. Concussion may be caused by a direct blow to the head, face, neck, or elsewhere on the body with an ‘impulsive’ force transmitted to the head.
2. Concussion typically results in the rapid onset of short-lived impairment of neurologic function that resolves spontaneously
3. Concussion may result in neuropathologic changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury.
4. Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course; however, it is important to note that in a small percentage of cases, postconcussive symptoms may be prolonged.
5. No abnormality on standard structural neuroimaging studies is seen with concussion.”

In summary, a concussion is a complex injury. It occurs as a result of mechanical force to the brain, and it affects the workings of the brain through:

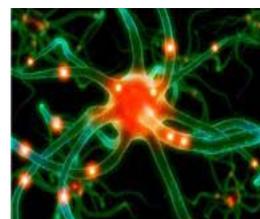
- Rapid-onset post-concussion signs and symptoms,
- A deterioration in balance and coordination, and/or
- A deterioration in cognitive functioning.

And, a concussion usually reveals normal imaging studies (i.e. CT Scan, MRI, etc...) with its effects progressively alleviating.

Recognizing a Concussion:

A Clinical Examination

Much like hitting the ‘funny bone’ in your elbow causes the ulnar nerve to be painful and temporarily incapacitated in its sensation and its coordination of muscle movement, a concussion could be compared to a worse version of the same condition occurring in the neurological tissues of the brain. Same neurological tissue, just in a different location, and at a much greater severity.



In a clinical examination, your Certified Athletic Trainer or Team Physician is therefore looking to find any evidence of deficits in the neurological functioning of the brain. Working off the Zurich definition of concussion, a clinical examination should focus on the following:

The Twelve Cranial Nerves:

As the name implies, the cranial nerves arise directly from the brain; unlike the spinal nerves that arise directly from the spinal cord. These twelve nerves perform sensation and motor movement about the head, face, and neck, and they are specifically responsible for the following:

- *Smell, Sight, Eye Movement and Pupil Size, Facial Sensation, Facial Expression, Taste, Hearing and Balance, Muscles of Speech, and the contraction of the upper trapezius and sternocleidomastoid muscles.

Therefore, by checking neurological functions like smooth, continuous eye tracking, pupils equal and reactive to light, visual acuity, taste, hearing, speech, and neck movements, your ATC or MD gains a good understanding of the current functional status of the cranial nerves.

Continued on page 2



Tulsa: 918.481.CSOS (2767) • Statewide: 888.269.CSOS (2767) • www.csosortho.com

Tulsa • Owasso • Vinita • Grove • Bixby • Jenks

R. Clio Robertson, MD
Don L. Hawkins, MD
David R. Hicks, MD
Michael W. Tanner, MD
Brian C. Howard, MD
James D. Cash, MD

David E. Nonweiler, MD
Randall L. Hendricks, MD
David K. Wong, MD
Bryan J. Hawkins, MD
Perry D. Inhofe, MD
Thomas G. Craven, MD

Jeffrey R. Morris, DO
Ronald S. LaButti, DO
Jeff A. Fox, MD
Kathleen M. Sisler, MD
Troy A. Glaser, DO

Recognizing a Concussion:

A Clinical Examination Continued

To take a closer look at the neurological tissues of the brain and their respective functions, the following must also be examined as well.

Orientation and Cognitive Functioning:

When someone sustains a concussion, very often are deficits noted in these areas . Likewise, examinations such as the SAC Test (Standardized Assessment of Concussion) allow your ATC or MD to obtain an objective assessment on the inner workings of the brain that are most commonly affected by concussion.

Balance and Coordination:

Although balance has been discussed previously, a detailed examination of balance and postural stability is vital. Examinations such as the Balance Error Scoring System (BESS) provide for a quantifiable measuring system of balance errors in a variety of postural stability challenges and on a variety of surfaces.

Post-Concussion Symptoms:

An objective assessment of how the patient is currently feeling is vital to concussion management. However, just gaining a simple yes or no to the presence of a symptom such as a headache is not very specific and it is difficult to demonstrate improvements or complications over time. In evaluating a patient's symptoms, a Likert Scale should be employed. For example:

Headache	Yes/No	1	2	3	4	5
Neck Pain	Yes/No	1	2	3	4	5
Confusion	Yes/No	1	2	3	4	5
Drowsiness	Yes/No	1	2	3	4	5

According to research, the utilization of a clinical examination to thoroughly evaluate the cranial nerves, orientation and cognitive functioning, balance and coordination, and patient-reported symptoms can be in the proximity of 85-95% effective for determining the presence of concussion. So, the next time you question if a patient has sustained a concussion, using this information should make it much easier to recognize.

Recognizing a Concussion:
The ImPACT Test

The Immediate Post-Concussion Assessment and Cognitive Testing, or ImPACT, is a 20-minute computerized testing program that combines the evaluation of orientation, cognitive functioning, and post-concussive symptoms into a much more in-depth neurocognitive analysis. As such, it allows the clinician to obtain a more accurate and in-depth measurement of the patient's verbal memory, visual memory, mental processing speed, and reaction time. And, because the test is done in front of a computer, it removes the possibility of clinician influence or error during the computerized portion of the assessment. Whether in high school, college, or professional athletics, a clinical evaluation and the ImPACT have become the current best-practice management of concussion.

If you would like to learn more about the ImPACT, and concussion management as a whole, visit the CSOS Sports Medicine and Wellness Website at <http://www.csosortho.com/sports-medicine.html>.

Also, if your or someone you know has sustained a concussion, contact the office of Dr. Troy Glaser, Team Physician for the Bixby Spartans and our CSOS ImPACT Certified Physician. Dr. Glaser's office is located at 12800 South Memorial in Bixby and can be reached by calling 918.394.CSOS.



A Note to the Reader.....

Central States Orthopedic Specialists does not endorse any of the organizations or research groups whose information has been published herein. Furthermore, information in this publication is provided for informational purposes only and not as medical advice, or as a substitute for the advice provided by your physician or other health-care professional, or for diagnosing or treating a health problem or disease. This publication is designed to provide you, the reader with information only. It is your choice in how you apply the information given herein, and not a directive from Central States Orthopedic Specialists. It is simply an informative resource for you, the reader. As always, if you have specific questions regarding specific injuries, illnesses, policies, procedures, etc... speak with your Certified Athletic Trainer, or contact your physician.



- | | | |
|-----------------------|--------------------------|------------------------|
| R. Clio Robertson, MD | David E. Nonweiler, MD | Jeffrey R. Morris, DO |
| Don L. Hawkins, MD | Randall L. Hendricks, MD | Ronald S. LaButti, DO |
| David R. Hicks, MD | David K. Wong, MD | Jeff A. Fox, MD |
| Michael W. Tanner, MD | Bryan J. Hawkins, MD | Kathleen M. Sisler, MD |
| Brian C. Howard, MD | Perry D. Inhofe, MD | Troy A. Glaser, DO |
| James D. Cash, MD | Thomas G. Craven, MD | |

Tulsa: 918.481.CSOS (2767) • Statewide: 888.269.CSOS (2767) • www.csosortho.com

Tulsa • Owasso • Vinita • Grove • Bixby • Jenks